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Pesticide Fact Sheet Number 81: Fluridone

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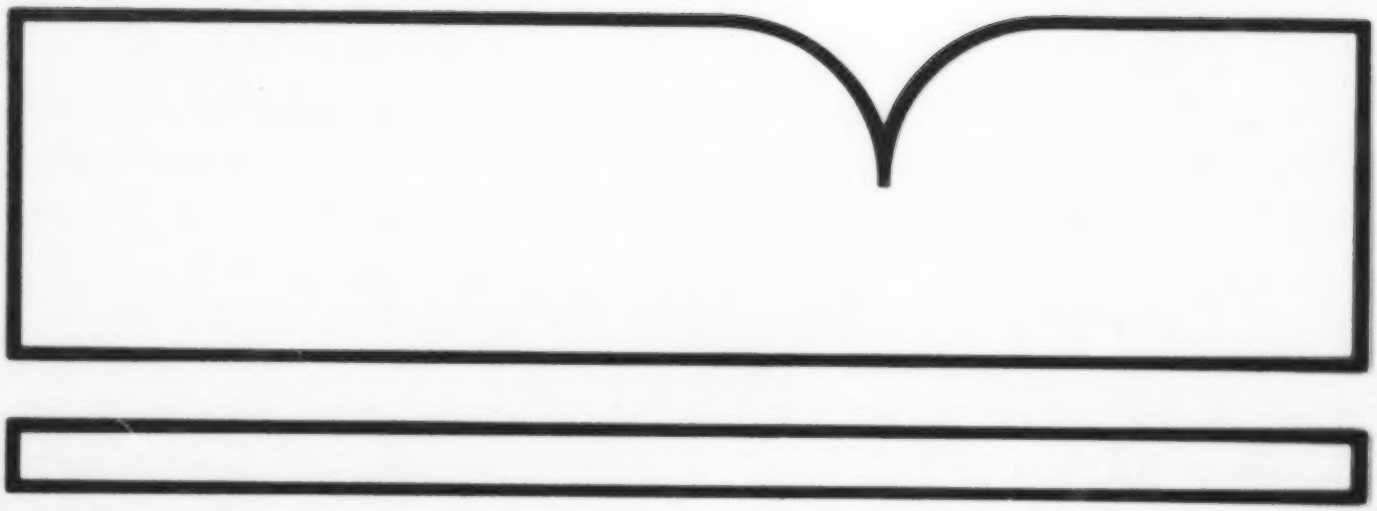

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16. Abstract (Limit: 200 words)

This document contains up-to-date chemical information, including a summary of the Agency's regulatory position and rationale, on a specific pesticide or group of pesticides. A Fact Sheet is issued after one of the following actions has occurred.

1. Issuance or reissuance of a registration standard,
2. Issuance of each special review document,
3. Registration of a significantly changed use pattern,
4. Registration of a new chemical, or
5. An immediate need for information to resolve controversial issues relating to a specific chemical or use pattern.

17. Document Analysis a. Descriptors

Pesticides, regulations, Chemical Information Fact Sheet, Use Patterns, Science Findings

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

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EPA

Pesticide Fact Sheet

Name of Chemical: Fluridone
Reason for Issuance: New Chemical Registration
Date Issued: March 1986
Fact Sheet Number: 81

1. Description of chemical

Generic name: 1-methyl-3-phenyl-5-[3-(trifluoromethyl)phenyl]-4[1H]-pyridinone
Common name: Fluridone
Trade name: Sonar
EPA Shaughnessy code: 112900-6
Year of initial registration: 1986
Pesticide type: Aquatic herbicide
U.S. and foreign producers: Elanco Products Company

2. Use patterns and formulations

Application sites: freshwater ponds, lakes, reservoirs, drainage canals, irrigation canals, rivers
Types of formulations: aqueous suspension; pellet
Types and methods of application: surface spray, weighted-hose dragged near bottom; broadcast (pellet)
Application rates: 0.5 lb ai/surface acre--4.0 lb ai/surface acre
Usual carrier: water

3. Science findings

Summary science statement: Supporting data base for fluridone registration and tolerance proposals supporting aquatic use is complete and acceptable except for a second species (rat) teratology study. Original study submitted did not produce teratogenic response at any level tested. The study, however, is not adequate for regulatory purposes because the highest dose tested did not produce frank maternal toxicity or fetotoxicity. The study is presently being repeated.

Chemical characteristics: Fluridone is a white (to offwhite) crystalline solid with no odor. The melting point is 154-155° C. The flashpoint for the aqueous suspension formulation is greater than 200° C. Fluridone is not corrosive to application equipment.

Toxicological characteristics:

Acute toxicology: Technical fluridone is in Category IV for acute oral effects in the rat and is moderately toxic through acute inhalation exposure. Eye irritation potential has been demonstrated as moderate to severe (Cat. III and Cat. II). The aqueous suspension and pellet formulations are in Cat. III for oral, dermal, skin, and eye irritation effects.

Chronic toxicology: A complete, acceptable chronic toxicity data base is available, except for a rat teratology study (second species). A valid rabbit teratology study indicates no teratogenic response up to a dose level of 300 mg/kg/day. Fluridone is not considered to have produced an oncogenic response in the mouse or rat. Mutagenicity assays submitted do not indicate genotoxic potential, gene mutation, or structural chromosomal aberration.

Physiological and biochemical behavioral characteristics: Fluridone is a systemic herbicide; it is absorbed from water by plant shoots and from hydrosoil by roots. Inhibits carotenoid synthesis which enhances degradation of chlorophyll, producing white (chlorotic) growing points in susceptible plants.

Environmental characteristics:

Degradation: Fluridone is stable to hydrolysis. It will photodegrade (half-life 34 hours in natural pond water).

Persistence: Under anaerobic aquatic conditions, fluridone has a half-life of 9 months. Half-life for fluridone in water is estimated to be 20 days; for hydrosoil, 90 days.

Bioaccumulation: Fluridone has a low potential for bioaccumulation in fish.

Ecological characteristics:

Avian studies: Acute oral (bobwhite quail) > 2000 mg/kg (slightly toxic). Avian dietary (bobwhite quail and mallard duck) > 5000 ppm. No impairment on reproduction for above species up to 1000 ppm dietary exposure.

Aquatic species studies:

Daphnia magna 48-hour acute is 6.3 mg/L (moderately toxic)
Bluegill sunfish 96-hour acute is 12 mg/L (moderately toxic)
Rainbow trout 96-hour acute is 11.7 mg/L (moderately toxic)
Sheepshead minnow 96-hour acute is 10.91 mg/L (moderately toxic)
Oyster embryo-larvae 48-hour acute is 16.51 mg/L (moderately toxic)
Maximum acceptable theoretical concentration (MATC) value for fathead minnow (second generation fry) was calculated to be > 0.48 < 0.96 mg/L. No treatment related effects were observed at or below 0.48 mg/L. Total length of 3 day-old fry was reduced at 2 mg/L fluridone.

Potential problems for endangered species:

Acute and MATC values indicate a potential hazard for aquatic organisms in shallow areas at higher treatment rates described on the label. Formal consultation with Office of Endangered Species (OES) has been initiated. To minimize hazard, label directions provide for use of lowest listed rates for shallow areas and consultation with Fish and Game agency or U.S. Fish and Wildlife Service if questions arise concerning aquatic resources in the area to be treated.

Tolerances proposed:

A tolerance is proposed for residues of the herbicide fluridone (1-methyl-3-phenyl5-[3-(trifluoromethyl)phenyl]-4(1H)-pyridinone) and its metabolite (1-methyl-3-(4-hydroxyphenyl)-5-[3-(trifluoromethyl)phenyl]-4(1H)-pyridinone) in fish at 0.5 ppm.

A tolerance is proposed for residues of the herbicide fluridone in the following raw agricultural commodities:

Commodity	Parts Per Million
Cattle, fat	0.05
Cattle, kidney	0.1
Cattle, liver	0.1
Cattle, meat byproducts	0.05
Cattle, meat (except liver and kidney)	0.05
Eggs	0.05
Goats, fat	0.05
Goats, kidney	0.1
Goats, liver	0.1
Goats, meat byproducts	0.05
Goats, meat (except liver and kidney)	0.05
Hogs, fat	0.05
Hogs, kidney	0.1
Hogs, liver	0.1
Hogs, meat byproducts	0.05
Hogs, meat (except liver and kidney)	0.05

Horses, fat	0.05
Horses, kidney	0.1
Horses, liver	0.1
Horses, meat byproducts	0.05
Horses, meat (except liver and kidney)	0.05
Milk	0.05
Poultry, fat	0.05
Poultry, kidney	0.1
Poultry, liver	0.1
Poultry, meat byproducts	0.05
Poultry, meat (except liver and kidney)	0.05
Sheep, fat	0.05
Sheep, kidney	0.1
Sheep, liver	0.1
Sheep, meat byproducts	0.05
Sheep, meat (except liver and kidney)	0.05

Tolerances are proposed in the following irrigated crops and crop groupings for residues of the herbicide fluridone resulting from use of irrigation water containing residues of 0.15 ppm following applications on or around aquatic sites. Where tolerances are established at higher levels from other uses of fluridone on the following crops, the higher tolerance also applies to residues in the irrigated commodity. The tolerances follow:

Commodity	Parts Per Million
Avocados	0.1
Citrus	0.1
Cottonseed	0.1
Cucurbits	0.1
Forage Grasses	0.15
Forage Legumes	0.15
Fruiting vegetables	0.1
Grain crop	0.1
Hops	0.1
Leafy vegetables	0.1
Nuts	0.1
Pome fruit	0.1
Root crops - vegetables	0.1
Seed and pod vegetables	0.1
Small fruit	0.1
Stone fruit	0.1

Based on the NOEL of 8 m/kg/day in the chronic rat feeding study and a 100-fold safety factor, the acceptable daily intake (ADI) has been set at 0.08 mg/kg/day with a maximum permissible intake (MPI) of 4.8 mg/day for a 60-kg person. There are no previously established tolerances for this herbicide.

The Agency is designating an acceptable residue level for fluridone in potable water at 0.15 ppm. This concentration reflects the maximum application rate for the herbicide registration(s) issued pursuant to FIFRA. Consumption of water is estimated at 2.0 liters per day for a 60-kg adult. These tolerances and the acceptable residue level in potable water result in a theoretical maximum residue contribution of 0.4112 mg/day in a 1.5-kg diet (including 2 liters of water) and use 8.57 percent of the ADI.

No Mexican, Canadian, or Codex maximum residue levels have been established. Residue studies are adequate to support the proposed tolerances. Plant and animal metabolism is adequately understood and adequate analytical methods are available to enforce the tolerance levels. The residue of concern in drinking water is parent compound, i.e., fluridone.

4. Summary of Regulatory Position and Rationale

Risk/benefit review: None of the risk criteria set forth in Title 40 Code of Federal Regulations §162.11 have been exceeded for fluridone.

Fluridone has been proposed only for direct application to aquatic sites. No ground water contamination issue is associated with this use.

5. Summary of Major Data Gaps

An additional rat (second species) teratology is underway. Schedule for submission: July 1, 1986.

6. Contact Person at EPA

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